REMARKS

Claims 1 and 2 have been amended and a new dependent claim 8 has been added; the new claim states that the outer circumferential wall is made of crystalline cordierite, a material used in the working examples. The claims before the Examiner are claims 1 to 8.

The rejection of claim 2 under the first paragraph of 35 USC 112 is believed overcome by the present change thereto. That claim now states that the material for the outer circumferential wall of the ceramic honeycomb structure is the same as or different from the ceramic honeycomb structure material, as indicated in the paragraph bridging pages 4 and 5 of the specification. Should the Examiner prefer other language, she is asked to contact the undersigned.

Claim 1 has been amended by changing "obtainable" to "obtained" better to define the invention. The change is intended to make it clear that the outer circumferential wall has been formed in the indicated matter and to remove any question that the wall might be formed in that way.

The rejection of claims 1, 2, and 4 to 6 under 35 USC 102 as anticipated by Kotani et al. '067 is respectfully traversed. The Examiner asserts that the phrase "so that when the structure is cooled from the firing temperature, compression is applied to the

inside partition wall from the outer circumferential wall portion" is suggestive or optional but does not require steps to be performed and does not limit the claim in any meaningful way. As indicated above, the independent claim has been changed to specify that the outer circumferential wall of the ceramic honeycomb structure is one "obtained by firing a layer of the raw material applied to a circumference of the ceramic honeycomb structure… ." The change is intended to make it absolutely clear that the ceramic honeycomb structure is formed in a particular way. With a layer of the raw material being fired, then there will be, due to the make of the materials in the invention, compression applied to the inside partition wall as the structure is cooled from the firing temperature. Claim 1 also states expressly that the outer circumferential wall thermal expansion coefficient is larger than the inside partition wall thermal expansion coefficient in a diameter direction. Accordingly, the claimed honeycomb structure distinguishes patentably from the article shown in the cited reference.

Applicant informs the Examiner that the application of compression to the inside portion wall through the outer circumferential wall portion is comparable to the compressive stress that occurs when a rubber band having a small size relative to the diameter of a honeycomb structure made of soft urethane is placed on the honeycomb structure to apply a clamping force

thereto. A representation thereof is shown in an attachment to the Reply.

The Examiner is directed to paragraphs 0020 to 2023 of the specification for a more detailed explanation of what was discussed above. Those paragraphs inform a reader that the thermal expansion coefficient of the inside (inner) wall portions is lower than the thermal expansion coefficient of the outer peripheral (circumferential) wall portion. One can achieve this difference by coating a thin layer of a material having a same or similar composition as that of the honeycomb structure on the outer peripheral wall portion and firing the coated layer at a temperature capable of forming, for example, a cordierite crystal; see paragraph 0023.

As understood, one must choose properly the materials for the honeycomb structure itself and the coating as explained in paragraphs 0020 to 0023. If the relationship indicated above cannot be achieved due to the inadequate selection of materials, one is unable to obtain the present honeycomb structure.

Kotani et al. '067 does not teach or suggest the present invention. The reference discloses that the coating of the intact (or original) outer peripheral wall of the reinforcing material is not good because of low resistance to thermal stress; see column 5, lines 44 to 54. As such, the reference teaching is entirely contrary to the technical concept of the present invention.

Moreover, Kotani et al. '067 teach that the coating is not acceptable because the coating can be peeled off easily during actual use; see column 5, lines 54 to 59. The present claims call for a "ceramic honeycomb structure" (thus suggesting unity) and therefore patentably distinguish over the reference article.

Moreover, Kotani et al. '067 teach merely that firing is optional; see column 6, lines 31 to 35. The patentees say nothing about firing the coated portion at a temperature capable of achieving the desired difference in thermal expansion coefficient as called for in present claim 1. Indeed, the patentees say clearly that such expansion and contraction, which may be derived from the reinforcing coating material showing a greater expansion and contraction of those counterpart values of the honeycomb body structure, may be effectively alleviated by the wall portion; see the discussion in the patent at column 6, lines 64 to column 7, line 9. Such a teaching is contradictory clearly to the present invention. Indeed the patentees suggest using cordierite for coating material because of the small thermal expansion coefficient; see column 7, lines 10 to 37, particularly lines 33 to 37.

Although both honeycomb structures in Kotani et al. '067 and in the instant invention are fired ones, the coated material on the outer circumferential wall in the present invention is one that achieves the objects of the present invention; see paragraph

0023 and Working Examples 1 to 5 and Comparative Examples 1 to 10 in the specification. No such teaching appears in Kotani et al. '067.

Kotani et al. '067 teaches using cordierite as aggregates, some of which may be replaced by ceramic fibers, taken with a binder such as colloidal silica to form the outer coating 16. The patentees state a preference of a small coefficient of thermal expansion of the outer coating 16; see column 7, lines 20 to 37. The working examples show drying rather than firing the coating and as do not teach or suggest the present invention.

In summary, the major (and patentable) differences between the honeycomb structure of Kotani et al. '067 and that of the present claims is that in the latter compression stress is applied to the inside of the structure at ambient temperature while no compressive stress is applied to the inside of the structure at a firing temperature. Kotani et al. '067, on the other hand, shows practically no compressive stress applied to the inside of the structure at ambient temperature (see column 7, lines 24 to 26). The present invention, as already indicated above, comes about because at the cooling stage after firing the outer circumferential wall portion shrinks more than the inside portion due to the high coefficient of thermal expansion and the compressive force that gets applied to that inside portion; see paragraph 0023. The rejection should be withdrawn.

The rejection of claims 1 to 3 and 5 under 35 USC 102 as anticipated by Matsubara et al. '148 is also respectfully traversed. The reference teaches a ceramic honeycomb structural body with irregular open-ended cells close to the outer peripheral wall of the body, those cells having walls thicker than the walls of cells elsewhere in the structural body. There is nothing in the patent about firing and cooling a raw material layer applied to the circumference of the ceramic honeycomb structure. The reference does not teach or suggest the makeup and structure of the invention as claimed here. The comments in the third sentence from the end of the paragraph bridging pages 4 and 5 of the Office Action are noted. Applicant respectfully submits that the language in claim 1 especially as revised is not suggestive or optional; the claim limitations regarding firing and cooling resulting in compression being applied to the inside partition wall portion from the outer circumferential wall potion are positive ones patentably distinguishing the claimed subject matter from the reference. While compression is mentioned in the reference at column 4, line 40, a full reading of the passage establishes that the compression is not that recited in instant claim 1. The rejection should be withdrawn.

The rejection of claim 7 under 35 USC 103 as unpatentable over Kotani et al. '067 is also respectfully traversed. Claim 7

depends from claim 1 and the former is patentable for the same reasons that the latter is patentable as discussed above.

The rejection of claim 3 under 35 USC 103 as unpatentable over Kotani et al. '067 in view of Beauseigneur et al. '722 is also respectfully traversed. The secondary reference is cited to show certain values of cells per unit area and wall thickness. The reference, however, does not supply that which is missing from Kotani et al. '067 and the rejection should be withdrawn as well.

In view of the foregoing revisions and remarks, it is respectfully submitted that claims 1 to 8 are in immediate condition for allowance and a USPTO paper to those ends is earnestly solicited.

The Examiner is requested to telephone the undersigned if additional changes are required in the case prior to allowance.

Respectfully submitted,

STEPTOE & JOHNSON LLP

July 15, 2005
Date

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Enclosure:
Drawing showing application of Compressive stress

Atty Dkt No.: 28953.7210
(WATK:210)

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